PATENT SPECIFICATION

663,460

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COMPLETE SPECIFICATION

Improvements in and relating to Waste Disposal Apparatus

We, THE BRITISH THOMSON-HOUSTON COMPANY LIMITED, a British Company having its registered office at Crown House, Aldwych, London, W.C.2, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to waste disposal devices of the type in which kitchen waste and the like is comminuted and flushed into a sewage system.

The comminuting or grinding means of these waste disposal devices include a garbage-receiving chamber having at or adjacent its bottom a rotatable disc provided with blade-like impeller members. Through suitable means a drive motor for the disc is started when water is caused to flow into or through the chamber, and largely by means of the impeller blades the pieces of garbage are thrown centrifugally against shredding devices or cutters fixed to the wall of the grinding chamber, and are ground or comminuted thereby. The mixture of finely ground garbage and water then passes through strainer openings in the wall of the chamber, to the waste line. Waste disposal devices of this type must handle all kinds of garbage and like kitchen waste, from long, hard bones to soft, fibrous materials such as peapods and the like. In contemporary constructions the impellers and shredder elements have been so arranged that the impellers pass in front of the shredders in relatively close proximity thereto so as to shear or chop the softer waste materials; but such constructions have not been entirely satisfactory with bones and other hard objects which may become confined between the impeller and the shredder element, with danger of jamming the mechanism, or held by the impellers and carried about the chamber without being ground.

It is, therefore, a principal object of the present invention to provide an improved grinding mechanism for garbage disposal apparatus which will handle all types of garbage with equal effectiveness.

In accordance with the invention we provide waste disposal apparatus of the type including a chamber to receive waste material and water, having means within the chamber to comminute the material and pass a mixture of material and water to a drain line, comprising a rotatable disc forming a floor for the chamber, the bottom portion of the chamber wall having strainer openings communicating between the chamber above the disc and drainage means disposed below the disc, the farther side edge of each strainer opening, considered in relation to the direction of rotation of the disc, projecting into the chamber above the disc as compared with the nearer side edge, and impeller means on the disc to move the waste material along the chamber wall upon rotation of the disc, the forward edge of the impeller means extending parallel to and into relatively close proximity to the projecting edges of the strainer openings, so as to co-operate therewith to shear particles of waste material caught therebetween.

In the accompanying drawings, Fig. 1 is a side elevation, partly in section, showing a garbage disposal apparatus embodying the present invention; Fig. 2 is a plan sectional view looking in the direction of lines 2—2 of Fig. 1; Fig. 3 is an exploded perspective of the comminution elements with only a portion of the shredder wall being shown; Fig. 4 is an end view of one of the impeller blades; and Fig. 5 is a fragmentary perspective of a second form of shredder wall.

A garbage disposal unit embodying the present invention comprises an upper casing portion 10 adapted for securing by suitable adapter rings 11 to the drainage opening of a kitchen sink or the like 12. A motor housing 13 affixed to the bottom portion of the casing contains a motor 14 with its shaft 15 supported in suitable bearings, as shown, for rotation in a vertical plane. An absorbent mass 16

[Price 2/-]

and wicks 17 comprise elements of a lubrication system. The motor frame wall 18 within which the motor shaft and bearings are supported is shaped to provide an annular drainage chamber 19 which receives the comminuted waste and water for discharge through a drainage fitting 19*a* which is connected with the usual trap (not shown) of a sewage system.

The casing 10 defines a main chamber 20 of substantial volume. Said chamber is desirably frusto-conical flaring somewhat more sharply at its lower portion to define a circular shredding chamber 21. The lower wall portion 22 of the shredding chamber is the area of greatest abrasive contact during operation, and it is advantageous to form said wall separately from hard, wear-resisting material; the remainder of the chamber may accordingly be made of a less expensive, preferably lighter weight material. Gaskets 23 and 24 of rubber or other resilient material are interposed between the wall 22 and the respective upper and lower casing parts, to seal against leakage and absorb vibrations incident to use. Projecting inwardly from the wall 22 so as to terminate well above the lower edge thereof are a suitable plurality of shredder elements 25. Three equidistantly spaced elements produce satisfactory results. These shredder elements cooperate with the impeller in comminuting the waste material, as presently described, and are subjected to severe vibrations and impact of the materials being operated upon. Hence, it is preferable to make the shredders integral with wall 22. The outer surface of the shredders 25 is grooved, as clearly appears in Fig. 3, to provide two or more preferably parallel and horizontal cutting edges 26.

Suitably supported on the end of shaft 15, as by threaded connection therewith, is a flywheel 27. Sealing means 30 guard against the introduction of waste matter into the shaft bearings. The flywheel has diametrically opposed pairs of ribs 31 and 32 which provide drainage passages 33 communicating with the drainage chamber 19, as shown in Fig. 1. The relatively wide slots 34 snugly receive the depending ears 35 of a disc 36 which rests upon and is supported by the respective ribs 31, 32. The disc may be screwed to the fly-wheel, as indicated. As is apparent from Fig. 1, the disc 36 forms the floor of the shredder chamber. The disc is provided with groups of drainage openings 37 which are positioned above the respective drainage passages 33, and are radially inward of the shredder wall 22.

The pairs of ears 35 are at diametrically opposite locations on the disc 36 and form mounting means for impeller blades 38, said blades being pivotally supported by the ears 35 and a suitable pin or bearing 40. The side walls of the respective slots 34 confine the pivot pins against sideward movement. The impeller blades 38 are of a hard wear-resistant material and in a preferred form, are shaped to provide spaced teeth 41, 42 between which is an arcuate edge portion 43. The upper wall of the impeller blades preferably slopes rearwardly, as indicated in Fig. 4, to give an incisive edge portion which will effectively gouge or tear the material within the shredder chamber as the flywheel rotates. It will be noted from Fig. 3 that, when in the operative position, said position being the result of centrifugal forces developed by the rapid rotation of the flywheel, the tooth edges of the impeller blades are at a relatively low elevation, with respect to the disc 36 ; and the upwardly sloping wall 44 about the impeller blades deflects material resting upon the disc 36 upwardly into forceful contact with the cutting edge of the impeller blades and the teeth thereof. Hard materials, such as pieces of bone, rise upwardly and over the relatively low impeller blades, to be cut and tumbled thereby and dropped into the path of the teeth of the next succeeding impeller element. The sloping wall surfaces are also effective to move and distribute masses of material during the starting stage of flywheel operation so as to prevent accumulation of materials which might jam the blades and impose an abnormal strain on the drive motor. Material resting upon the centre portion of the disc is effectively distributed and set in motion by the edged abutments 45 projecting upwardly from the central zone of the disc.

The impeller blades 38 are freely rotatable with respect to the flywheel and are balanced so that when the flywheel is at rest the blade will rotate clockwise of Fig. 1 until its rear wall 46 rests against the end wall 47 of the blade pocket. Under the influence of centrifugal force, the blade will rotate in the opposite direction until it comes into operative position, determined by the engagement of shoulder 48 with the underside of the flywheel disc, in which the forward edge 49 of blade 38 is in close relationship with the lower portion of wall 22, and the top of tooth 41 is beneath and in close relationship with the bottom wall of the shredder element 25. The clearances are such that soft materials, and particularly soft, stringy materials, are sheared between the front edge of the blade and the wall 22, or between the upper edge of tooth 41 and either the shredder element 25 or the sharp shoulder 50 provided in wall 22, as appears clearly in Fig. 1. Notwithstanding

this close clearance, jamming is prevented by the freedom with which the impeller blades may rotate into reclined position. Hard, bulky materials are engaged, cut and tumbled by the impeller blades, as aforesaid. With the blades beneath the level of the shredder elements, it is practically impossible for a hard bone, or the like, to become jammed between a blade and a shredder. Such materials will be tumbled upwardly against the shredder or over the impeller, but will not jam against the shredder.

As is well known in the art, the devices are provided with switch means which start the motor only when the water flows into the chamber 20. Such switch controls, being well known and forming no part of the present invention, have not been illustrated. The mass of comminuted waste material and water within the shredder chamber is thrown outwardly against the wall 22 which is provided with strainer grooves or ports 52 communicating with the drainage chamber 19. In the number and arrangement of the drainage ports, the present invention differs importantly from the prior art of which we are aware; instead of the usual forty or more strainer grooves closely spaced around the lower edge of wall 22, the present invention has but six, and each of them cooperates with the forward edge 49 of the impeller blades to provide additional shearing surfaces, particularly effective with regard to the softer, stringier materials such as pea pods and the like.

In the embodiment of Figs. 2 and 3, the portion of the shredder chamber wall 22 below the shoulder 50 is formed as a series of short walls which extend outwardly in the direction of rotation of the impeller, from the trailing edge 53 of each strainer port 52 to the leading edge 54 of the next port. The walls may be outwardly spiralling arcs, for example. Each trailing edge 53 therefore projects forwardly beyond its associated leading edge into the shredder chamber and provides a cutting surface for cooperation with the cutting edge of the forward wall 49 of each impeller blade. In the embodiment of Fig. 5, the edge 53*a* of the respective strainer ports is determined by a projecting shoulder 55 formed integral with the shredder wall. Either of these constructions insures a positive cutting or grinding operation at the strainer grooves, and avoids the possibility of the waste material merely sliding across the face of the strainer grooves.

It will be seen therefore that the blades 38 act not only as impellers to throw the garbage against the shredder wall 22 but individually and in cooperation with the under-surface of the shredder elements 25 and the edges 53 or 53*a* of the drainage ports 52, as cutters for both hard and soft materials. The continuous movement of the waste within the shredder chamber, caused by the tumbling of the hard bones over the blades and the rebound or deflection of materials from the drainage openings increases the efficiency of the comminution operation by exposing constantly changing surfaces or edges of the waste materials to shearing or cutting action, and prodnces a thorough saturation of the waste with the water supplied to the unit during the grinding operation. The mixture of finely divided waste and water passes through the strainer grooves 52 into the chamber 19, whence it is driven by the positive pumping action of the projections 56 of the flywheel 27 into the outlet 19*a* and then to the plumbing system.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Waste disposal apparatus of the type including a chamber to receive waste material and water, having means within the chamber to comminute the material and pass a mixture of material and water to a drain line, comprising a rotatable disc forming a floor for the chamber, the bottom portion of the chamber wall having strainer openings communicating between the chamber above the disc and drainage means disposed below the disc, the farther side edge of each strainer opening, considered in relation to the direction of rotation of the disc, projecting into the chamber above the disc as compared with the nearer side edge, and impeller means on the disc to move the waste material along the chamber wall upon rotation of the disc, the forward edge of the impeller means extending parallel to and into relatively close proximity to the projecting edges of the strainer openings, so as to co-operate therewith to shear particles of waste material caught therebetween.

2. Waste disposal apparatus as claimed in claim 1 wherein the chamber wall, for at least the height of the strainer openings, is formed as a series of arcs extending uniformly outwardly from the farther side edge of the openings, considered in relation to the direction of rotation of the disc, to the nearer edge of the next succeeding opening, whereby at each opening there is an edge wall projecting into the chamber to cooperate with the impeller means on the disc.

3. Waste disposal apparatus as claimed in claim 1, the chamber wall, at the farther side edge of each strainer opening considered in relation to the direction of

rotation of the disc, having a rigid projection extending into the chamber above the disc and presenting a sharp edge facing the direction of rotation of said disc.

4. A waste disposal apparatus as claimed in claim 1, 2 or 3 having edged shredding members fixed relative to the rotatable disc and projecting into the chamber above the disc and in spaced relation therewith, and one or more impeller blades pivotally mounted at the periphery of the flywheel, each blade having a vertical forward wall, considered in relation to the direction of rotation of the disc, which rises vertically from the disc to a cutting edge being at all times beneath the level of the lower edge of the shredding members, and the radially outermost wall providing a cutting edge which sweeps in close relation to the projecting edges of the strainer openings.

5. Waste disposal apparatus constructed and arranged substantially as hereinbefore described and shown in the accompanying drawings.

Dated this 16th day of November, 1949.

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Agent for the Applicants.

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FIG. 1.

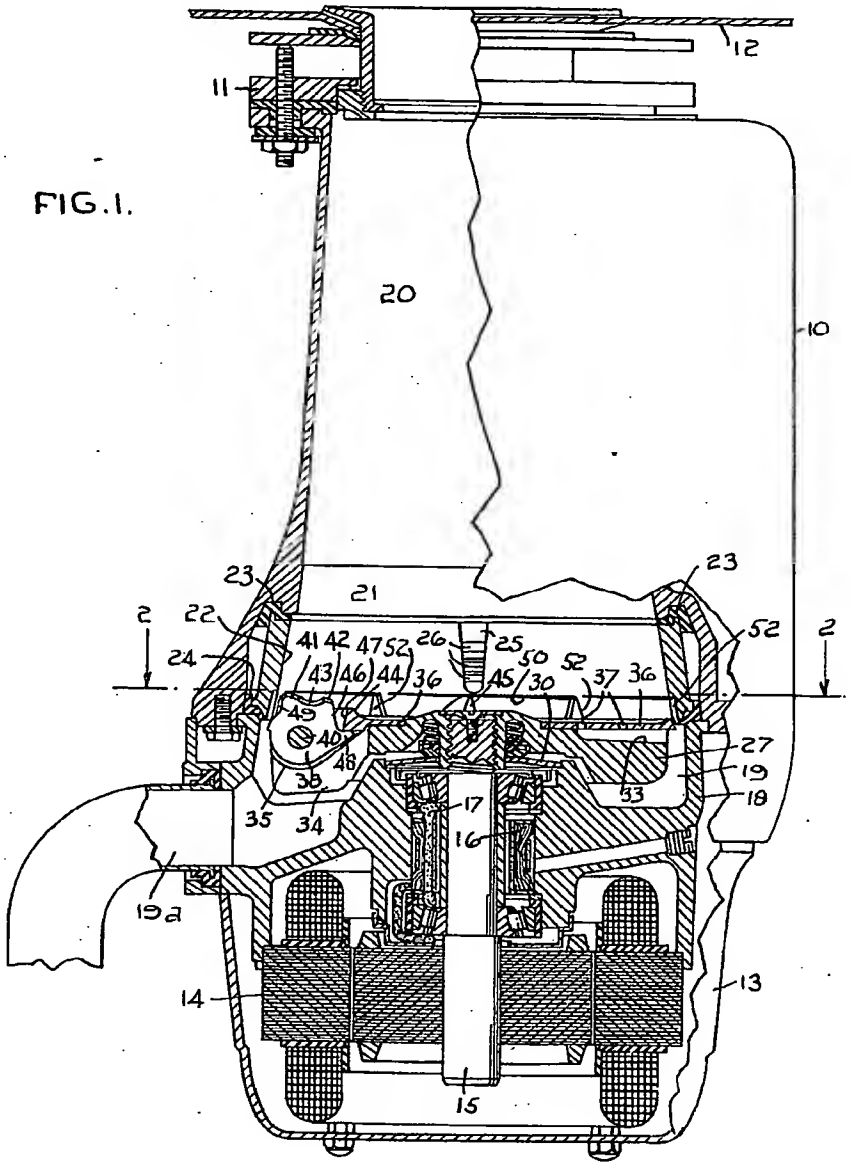

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FIG. 2.

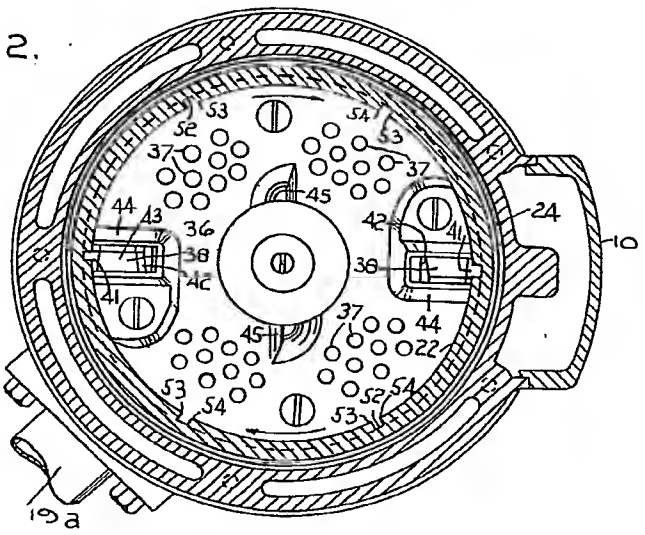

FIG. 4.

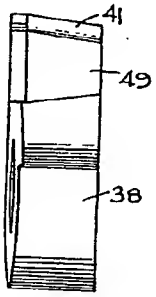

FIG. 5.

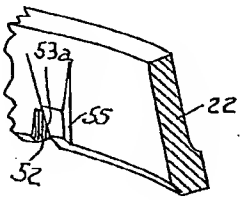

FIG.3.

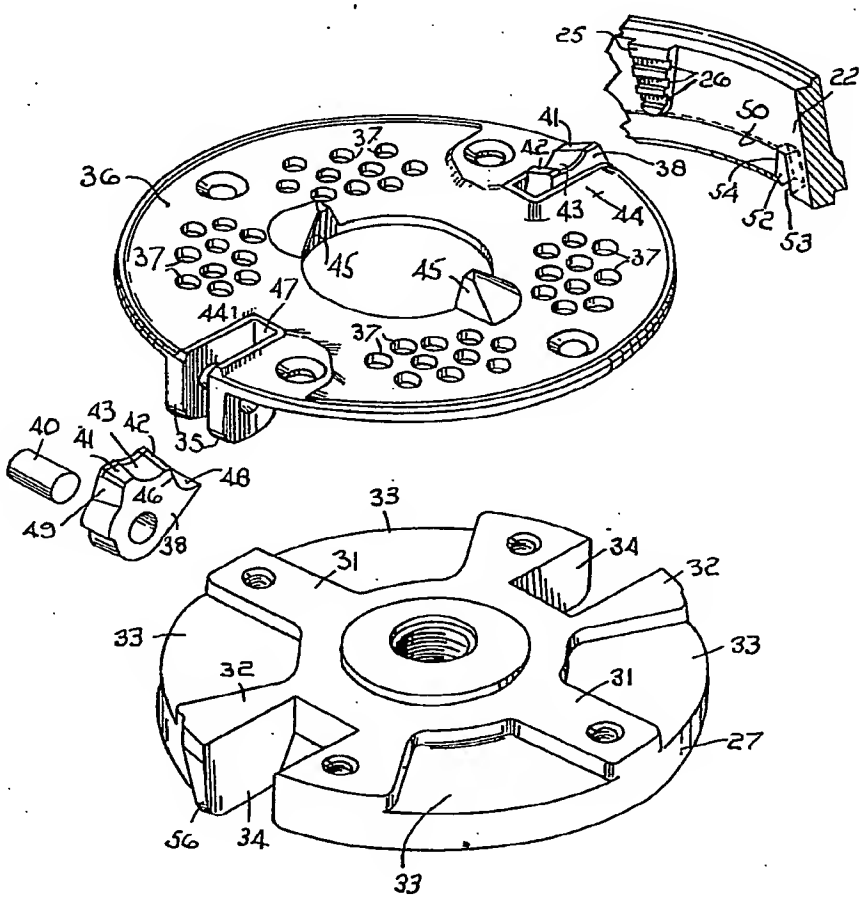
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FIG. 2.

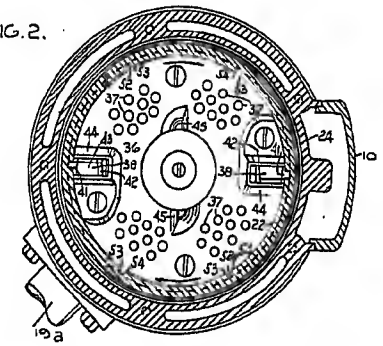

FIG. 3.

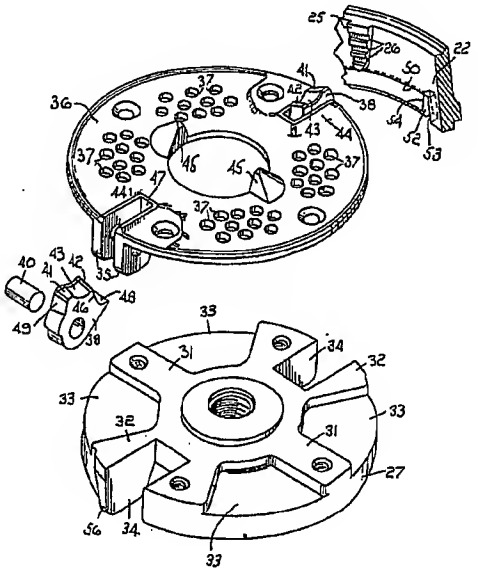

FIG. 4.

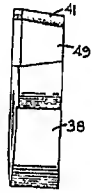

FIG. 5.